# EMC REPORT

| | |
|---|---|
| **Applicant:** | SHENZHEN WLINK TECHNOLOGY CO.,LIMITED |
| **Address of Applicant:** | 319, YiBen Electronic Business Building, NO.1063 ChaGuang Road, XiLi, NanShan District, ShenZhen, China |
| **Manufacturer/Factory:** | SHENZHEN WLINK TECHNOLOGY CO.,LIMITED |
| **Address of Manufacturer/ Factory:** | 319, YiBen Electronic Business Building, NO.1063 ChaGuang Road, XiLi, NanShan District, ShenZhen, China |

**Equipment Under Test (EUT)**

| | |
|---|---|
| Product Name: | Industrial 3G/4G Cellular Router |
| Model No.: | WL-R520 |
| **Applicable standards:** | ETSI EN 301 489-1 V2.2.0 (2017-03) Draft<br>ETSI EN 301 489-17 V3.2.0 (2017-03) Draft<br>ETSI EN 301 489-52 V1.1.0 (2016-11) Draft<br>EN 55032:2015<br>EN 55024:2010/A1:2015<br>EN 61000-3-2:2014<br>EN 61000-3-3:2013 |
| **Date of sample receipt:** | May 25, 2017 |
| **Date of Test:** | May 25, 2017 – June 15, 2017 |
| **Date of report issue:** | June 15, 2017 |
| **Test Result :** | PASS * |

*In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 2014/50/EU are considered.

**Robinson Lo**
**Laboratory Manager**

## 2 Version

| Version No. | Date | Description |
|---|---|---|
| *00* | *June 15, 2017* | *Original* |
| | | |
| | | |
| | | |
| | | |

***Prepared By:*** Edward.Pan ***Date:*** *June 15, 2017*

***Project Engineer***

***Check By:*** Andy.wu ***Date:*** *June 15, 2017*

***Reviewer***

# 3 Contents

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# 4 Test Summary

| EMI Test | | | | |
|---|---|---|---|---|
| Test Item | Test Requirement | Test Method | Application | Result |
| Radiated Emission | ETSI EN 301 489-17<br>ETSI EN 301 489-52<br>EN 55032 | ETSI EN301 489-1<br>EN 55032 | Enclosure | Pass |
| Conducted Emission | ETSI EN 301 489-17<br>ETSI EN 301 489-52<br>EN 55032 | ETSI EN301 489-1<br>EN 55032 | AC port | Pass |
| Harmonic Current Emissions | ETSI EN 301 489-17<br>ETSI EN 301 489-52<br>EN 55032 | ETSI EN301 489-1<br>EN 55032 | AC port | N/A |
| Voltage Fluctuations and Flicker | ETSI EN 301 489-17<br>ETSI EN 301 489-52<br>EN 55032 | ETSI EN301 489-1<br>EN 55032 | AC port | Pass |
| **EMS Test** | | | | |
| ESD (Electrostatic Discharge) | ETSI EN 301 489-17<br>ETSI EN 301 489-52<br>EN 55032 | EN 61000-4-2 | Enclosure | Pass |
| Radiated Immunity, 80MHz to 2.7 GHz | ETSI EN 301 489-17<br>ETSI EN 301 489-52<br>EN 55032 | EN 61000-4-3 | Enclosure | Pass |
| EFT (Electrical Fast Transients | ETSI EN 301 489-17<br>ETSI EN 301 489-52<br>EN 55032 | EN 61000-4-4 | AC port | Pass |
| Surge Immunity | ETSI EN 301 489-17<br>ETSI EN 301 489-52<br>EN 55032 | EN 61000-4-5 | AC port | Pass |
| Injected Currents 150kHz to 80MHz | ETSI EN 301 489-17<br>ETSI EN 301 489-52<br>EN 55032 | EN 61000-4-6 | AC port | Pass |
| Voltage Dips and Interruptions | ETSI EN 301 489-17<br>ETSI EN 301 489-52<br>EN 55032 | EN 61000-4-11 | AC port | Pass |

*Remark:*
*Pass: The EUT complies with the essential requirements in the standard.*
*N/A: not applicable.*

# 5 General Information

## 5.1 General Description of EUT

| | |
|---|---|
| Product Name: | Industrial 3G/4G Cellular Router |
| Model No.: | WL-R520 |
| Operation Frequency: | UTRA-FDD: BAND 1, BAND 8<br>E-UTRA: BAND 1, BAND 3, BAND 7, BAND 8, BAND 20<br>WIFI: 2412MHz ~ 2472MHz |
| Modulation Type: | UTRA-FDD & E-UTRA: QPSK, 16QAM<br>WIFI: DSSS, OFDM |
| Antenna Type: | External Antenna |
| Antenna Gain: | UTRA-FDD & E-UTRA<br>WIFI:2dBi |
| Power Supply: | AC-DCAdapter<br>Model:TS-A018-120015AZ<br>Input:100-240V, 50/60Hz, 0.6A<br>Output: DC 12.0V, 1.5A |

## 5.2 Operating Modes

| Operating mode | Detail description |
|---|---|
| LAN mode | Keep the EUT inLAN mode. |
| WiFi mode | Keep the EUT in charging and play internet information by wifi network. |
| Traffic mode (UTRA-FDD;GSM) | Link+Adapter (The EUT shall be commanded to operate at maximum transmit power.) |
| Idle mode (UTRA-FDD GSM) | Idle+Adapter (The EUT was registered in the mentioned band.) |
| Traffic mode (E-UTRA) | Link+Adapter (The EUT shall be commanded to operate at maximum transmit power.) |
| Idle mode (E-UTRA) | Idle+Adapter (The EUT was registered in the mentioned band.) |

## 5.3 Description of Support Units

| Ancillary equipment | Manufacturer | Model |
|---|---|---|
| Universal radio communication tester | Rohde & Schwarz | CMU200 |
| Wideband Radio Communication Tester | Rohde & Schwarz | CMW500 |

## 5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

**●FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered andfuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 22, 2016

**● Industry Canada (IC)—Registration No.:9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.

## 5.5 Test Location

RI test was performed at:

China Shenzhen Academy of Metrology and Quality Inspection,
Metrology and Quality Inspection building, Central Section of LongZhu Road, Nan Shan, Shenzhen, China.

All other tests were performed at:

Global United Technology Services Co., Ltd.
No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China
Tel: 0755-27798480; Fax: 0755-27798960

## 5.6 Deviation from Standards

None.

## 5.7 Abnormalities from Standard Conditions

None.

## 5.8 Other Information Requested by the Customer

None.

# 6 Equipment Used during Test

| Radiated Emission: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.2(L)*6.2(W)* 6.4(H) | GTS250 | July. 03 2015 | July. 02 2020 |
| 2 | Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | GTS251 | N/A | N/A |
| 3 | EMI Test Receiver | Rohde & Schwarz | ESU26 | GTS203 | June. 29 2016 | June. 28 2017 |
| 4 | BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9163 | GTS214 | June. 29 2016 | June. 28 2017 |
| 5 | Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | 9120D-829 | GTS208 | June. 29 2016 | June. 28 2017 |
| 6 | Horn Antenna | ETS-LINDGREN | 3160 | GTS217 | June. 29 2016 | June. 28 2017 |
| 7 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 8 | Coaxial Cable | GTS | N/A | GTS213 | June. 29 2016 | June. 28 2017 |
| 9 | Coaxial Cable | GTS | N/A | GTS211 | June. 29 2016 | June. 28 2017 |
| 10 | Coaxial cable | GTS | N/A | GTS210 | June. 29 2016 | June. 28 2017 |
| 11 | Coaxial Cable | GTS | N/A | GTS212 | June. 29 2016 | June. 28 2017 |
| 12 | Amplifier(100kHz-3GHz) | HP | 8347A | GTS204 | June. 29 2016 | June. 28 2017 |
| 13 | Amplifier(2GHz-20GHz) | HP | 8349B | GTS206 | June. 29 2016 | June. 28 2017 |
| 14 | Amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | June. 29 2016 | June. 28 2017 |
| 15 | Band filter | Amindeon | 82346 | GTS219 | June. 29 2016 | June. 28 2017 |
| 16 | Constant temperature and humidity box | Oregon Scientific | BA-888 | GTS248 | June. 29 2016 | June. 28 2017 |
| 17 | D.C. Power Supply | Instek | PS-3030 | GTS232 | June. 29 2016 | June. 28 2017 |
| 18 | Universal radio communication tester | Rohde & Schwarz | CMU200 | GTS235 | June. 29 2016 | June. 28 2017 |
| 19 | Wideband Radio Communication Tester | Rohde & Schwarz | CMW500 | GTS588 | June. 29 2016 | June. 28 2017 |
| 20 | Splitter | Agilent | 11636B | GTS237 | June. 29 2016 | June. 28 2017 |

| Conducted Emission: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Shielding Room | ZhongYu Electron | 7.3(L)x3.1(W)x2.9(H) | GTS252 | May.16 2014 | May.15 2019 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | GTS552 | June. 29 2016 | June. 28 2017 |
| 3 | Coaxial Switch | ANRITSU CORP | MP59B | GTS225 | June. 29 2016 | June. 28 2017 |
| 4 | Artificial Mains Network | SCHWARZBECK MESS | NSLK8127 | GTS226 | June. 29 2016 | June. 28 2017 |
| 5 | Coaxial Cable | GTS | N/A | GTS227 | N/A | N/A |
| 6 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 7 | Thermo meter | KTJ | TA328 | GTS233 | June. 29 2016 | June. 28 2017 |

| ESD: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | ESD Simulator | KIKUSUI | KES4021A | GTS242 | June. 29 2016 | June. 28 2017 |
| 2 | Thermo meter | KTJ | TA328 | GTS243 | June. 29 2016 | June. 28 2017 |

| Conducted Immunity: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Signal Generator | SCHLODER | CDG-6000-25 | GTS553 | June. 29 2016 | June. 28 2017 |
| 2 | CDN | SCHLODER | CDN-M2+3 | GTS554 | June. 29 2016 | June. 28 2017 |
| 3 | ATT | SCHLODER | ATT-6DB-100 | GTS556 | June. 29 2016 | June. 28 2017 |

| Harmonic/ Flicker: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | HARMONIC/FLICKER ANALYZER | KIKUSUI | KHA1000 | GTS235 | June. 29 2016 | June. 28 2017 |
| 2 | AC POWER SUPPLY | KIKUSUI | PCR4000LE | GTS236 | June. 29 2016 | June. 28 2017 |
| 3 | LINE IMPEDANCE NETWORK | KIKUSUI | LIN1020JF | GTS237 | June. 29 2016 | June. 28 2017 |
| 4 | Thermo meter | KTJ | TA328 | GTS256 | June. 29 2016 | June. 28 2017 |

| EFT, Surge, Voltage dips and Interruption: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | EMTEST system | EMTEST | UCS500N | GTS239 | June. 29 2016 | June. 28 2017 |
| 2 | Thermo meter | KTJ | TA328 | GTS238 | June. 29 2016 | June. 28 2017 |

| Radiated Immunity: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Serial NO.** | **Cal.Date (mm-dd-yy)** | **Cal.DueDate (mm-dd-yy)** |
| 1 | Signal Generator | Rohde & Schwarz | SMT03 | 100059 | Jan. 17 2016 | Jan. 16 2017 |
| 2 | Power Amplifier | AR | 150W1000 | 300999 | Jan. 17 2016 | Jan. 16 2017 |
| 3 | Power Amplifier | AR | 25S1G4AM1 | 305993 | Jan. 17 2016 | Jan. 16 2017 |
| 4 | Power Amplifier | AR | 150A220M6 | 305965 | Jan. 17 2016 | Jan. 16 2017 |
| 5 | Broadband antenna | CHASE | CBL6111C | 2576 | Jan. 17 2016 | Jan. 16 2017 |
| 6 | Horn Antenna | AR | AT4002A | 2783 | Jan. 17 2016 | Jan. 16 2017 |

| General used equipment: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Humidity/ Temperature Indicator | Shanghai | ZJ1-2B | GTS243 | June.29 2016 | June. 28 2017 |
| 2 | Barometer | ChangChun | DYM3 | GTS255 | June. 29 2016 | June. 28 2017 |

# 7 EMC Requirements Specification in ETSI EN 301 489-17/EN 301 489-52/EN 55032

## 7.1 EMI (Emission)

### 7.1.1 Radiated Emission

| | |
|---|---|
| Test Requirement: | ETSI EN 301 489-17/-52, EN 55032 |
| Test Method: | ETSI EN 301 489-1 and EN55016-2-3 |
| TestFrequencyRange: | 30MHz to 6GHz |
| Test site: | Measurement Distance: 3m |

Receiver setup:

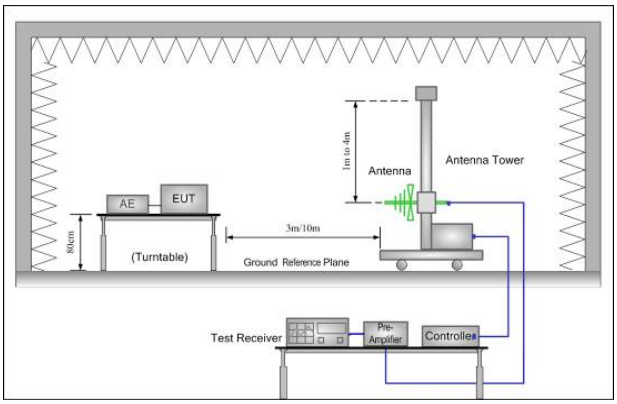
| Frequency | Detector | RBW | VBW | Remark |
|---|---|---|---|---|
| 30MHz-1GHz | Quasi-peak | 100kHz | 300kHz | Quasi-peak Value |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak Value |
| | AV | 1MHz | 3MHz | Average Value |

Limit:

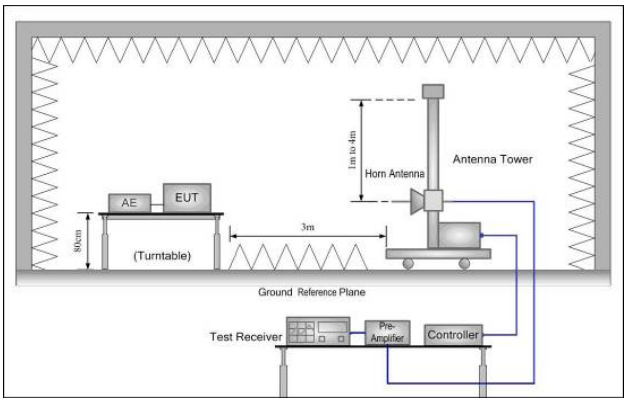
| Frequency | Limit (dBuV/m @3m) | Remark |
|---|---|---|
| 30MHz-230MHz | 40.00 | Quasi-peak Value |
| 230MHz-1GHz | 47.00 | Quasi-peak Value |
| 1GHz-3GHz | 50.00 | Average Value |
| | 70.00 | Peak Value |
| 3GHz-6GHz | 54.00 | Average Value |
| | 74.00 | Peak Value |

Test setup:

Below 1GHz




Above 1GHz



| | |
|---|---|
| Test Procedure: | ■ **From 30MHz to 1GHz:**<br>1. The radiated emissions test was conducted in a semi-anechoic chamber.<br>2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.<br>3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.<br>4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.<br>■ **Above 1GHz:**<br>1. The radiated emissions test was conducted in a fully-anechoic chamber.<br>2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.<br>3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT.<br>4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization. |
| Test environment: | Temp.: 25 °C Humid.: 50% Press.: 1 010mbar |
| Measurement Record: | Uncertainty: ±4.5dB |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details. Only show test data of the worse mode on the test report. |
| Test results: | Pass |

Remark:
1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

**Measurement Data**

**Below 1GHz**

WIFI Mode

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|
| 31.62 | 40.80 | 14.32 | 0.57 | 30.09 | 25.60 | 40.00 | -14.40 | Vertical |
| 50.06 | 37.76 | 15.25 | 0.77 | 30.00 | 23.78 | 40.00 | -16.22 | Vertical |
| 121.98 | 48.71 | 12.19 | 1.38 | 29.56 | 32.72 | 40.00 | -7.28 | Vertical |
| 148.96 | 50.89 | 10.26 | 1.56 | 29.41 | 33.30 | 40.00 | -6.70 | Vertical |
| 194.45 | 51.24 | 12.56 | 1.81 | 29.22 | 36.39 | 40.00 | -3.61 | Vertical |
| 292.06 | 50.34 | 14.89 | 2.32 | 29.95 | 37.60 | 47.00 | -9.40 | Vertical |
| 49.36 | 32.37 | 15.29 | 0.77 | 30.00 | 18.43 | 40.00 | -21.57 | Horizontal |
| 62.87 | 32.11 | 13.50 | 0.88 | 29.90 | 16.59 | 40.00 | -23.41 | Horizontal |
| 133.15 | 46.98 | 10.67 | 1.46 | 29.49 | 29.62 | 40.00 | -10.38 | Horizontal |
| 175.65 | 49.84 | 11.36 | 1.72 | 29.30 | 33.62 | 40.00 | -6.38 | Horizontal |
| 245.95 | 55.58 | 14.08 | 2.10 | 29.61 | 42.15 | 47.00 | -4.85 | Horizontal |
| 291.04 | 51.04 | 14.89 | 2.32 | 29.94 | 38.31 | 47.00 | -8.69 | Horizontal |

UTRA-FDD Mode

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|
| 48.50 | 40.79 | 15.34 | 0.76 | 30.01 | 26.88 | 40.00 | -13.12 | Vertical |
| 87.42 | 39.30 | 13.18 | 1.09 | 29.76 | 23.81 | 40.00 | -16.19 | Vertical |
| 125.45 | 51.23 | 11.61 | 1.40 | 29.54 | 34.70 | 40.00 | -5.30 | Vertical |
| 159.78 | 50.87 | 10.64 | 1.63 | 29.36 | 33.78 | 40.00 | -6.22 | Vertical |
| 207.85 | 49.39 | 12.80 | 1.89 | 29.28 | 34.80 | 40.00 | -5.20 | Vertical |
| 302.48 | 47.34 | 15.08 | 2.37 | 29.98 | 34.81 | 47.00 | -12.19 | Vertical |
| 59.86 | 34.42 | 14.71 | 0.86 | 29.92 | 20.07 | 40.00 | -19.93 | Horizontal |
| 112.13 | 39.70 | 13.83 | 1.30 | 29.62 | 25.21 | 40.00 | -14.79 | Horizontal |
| 142.82 | 50.00 | 10.21 | 1.52 | 29.44 | 32.29 | 40.00 | -7.71 | Horizontal |
| 186.44 | 49.55 | 12.24 | 1.77 | 29.25 | 34.31 | 40.00 | -5.69 | Horizontal |
| 220.62 | 49.96 | 13.20 | 1.96 | 29.39 | 35.73 | 40.00 | -4.27 | Horizontal |
| 294.11 | 47.04 | 14.95 | 2.33 | 29.97 | 34.35 | 47.00 | -12.65 | Horizontal |

E-UTRA Mode

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|
| 53.51 | 38.06 | 15.08 | 0.80 | 29.97 | 23.97 | 40.00 | -16.03 | Vertical |
| 85.30 | 41.42 | 12.45 | 1.07 | 29.77 | 25.17 | 40.00 | -14.83 | Vertical |
| 127.67 | 48.76 | 11.32 | 1.42 | 29.52 | 31.98 | 40.00 | -8.02 | Vertical |
| 153.20 | 51.81 | 10.39 | 1.59 | 29.39 | 34.40 | 40.00 | -5.60 | Vertical |
| 188.41 | 49.67 | 12.40 | 1.78 | 29.24 | 34.61 | 40.00 | -5.39 | Vertical |
| 283.98 | 48.75 | 14.75 | 2.29 | 29.90 | 35.89 | 47.00 | -11.11 | Vertical |
| 64.66 | 32.71 | 12.84 | 0.90 | 29.89 | 16.56 | 40.00 | -23.44 | Horizontal |
| 116.95 | 44.78 | 13.00 | 1.34 | 29.59 | 29.53 | 40.00 | -10.47 | Horizontal |
| 149.49 | 52.02 | 10.26 | 1.56 | 29.41 | 34.43 | 40.00 | -5.57 | Horizontal |
| 193.77 | 48.23 | 12.56 | 1.81 | 29.22 | 33.38 | 40.00 | -6.62 | Horizontal |
| 234.99 | 51.55 | 13.83 | 2.05 | 29.52 | 37.91 | 47.00 | -9.09 | Horizontal |
| 270.38 | 54.20 | 14.38 | 2.22 | 29.80 | 41.00 | 47.00 | -6.00 | Horizontal |

LAN Mode

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|
| 51.66 | 36.72 | 15.17 | 0.79 | 29.99 | 22.69 | 40.00 | -17.31 | Vertical |
| 83.23 | 41.49 | 11.72 | 1.06 | 29.78 | 24.49 | 40.00 | -15.51 | Vertical |
| 144.84 | 50.47 | 10.23 | 1.53 | 29.43 | 32.80 | 40.00 | -7.20 | Vertical |
| 210.79 | 46.83 | 12.90 | 1.90 | 29.30 | 32.33 | 40.00 | -7.67 | Vertical |
| 289.00 | 49.51 | 14.84 | 2.31 | 29.93 | 36.73 | 47.00 | -10.27 | Vertical |
| 354.18 | 47.13 | 16.33 | 2.64 | 29.72 | 36.38 | 47.00 | -10.62 | Vertical |
| 56.79 | 32.12 | 14.89 | 0.83 | 29.94 | 17.90 | 40.00 | -22.10 | Horizontal |
| 114.11 | 41.23 | 13.52 | 1.31 | 29.60 | 26.46 | 40.00 | -13.54 | Horizontal |
| 137.42 | 49.35 | 10.35 | 1.49 | 29.47 | 31.72 | 40.00 | -8.28 | Horizontal |
| 180.65 | 49.91 | 11.76 | 1.74 | 29.27 | 34.14 | 40.00 | -5.86 | Horizontal |
| 228.49 | 49.23 | 13.57 | 2.01 | 29.47 | 35.34 | 40.00 | -4.66 | Horizontal |
| 281.01 | 53.21 | 14.70 | 2.27 | 29.88 | 40.30 | 47.00 | -6.70 | Horizontal |

**Above 1GHz**

WIFI Mode

Peak measurement

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|
| 1330.00 | 36.45 | 25.68 | 4.57 | 33.30 | 33.40 | 70.00 | -36.60 | Vertical |
| 2245.00 | 35.20 | 28.01 | 5.23 | 34.19 | 34.25 | 70.00 | -35.75 | Vertical |
| 3160.00 | 36.75 | 28.85 | 6.27 | 33.14 | 38.73 | 74.00 | -35.27 | Vertical |
| 3730.00 | 32.16 | 29.27 | 7.38 | 32.48 | 36.33 | 74.00 | -37.67 | Vertical |
| 4915.00 | 30.02 | 31.89 | 8.69 | 32.14 | 38.46 | 74.00 | -35.54 | Vertical |
| 5625.00 | 27.69 | 32.32 | 9.70 | 32.36 | 37.35 | 74.00 | -36.65 | Vertical |
| 1385.00 | 36.14 | 25.62 | 4.61 | 33.42 | 32.95 | 70.00 | -37.05 | Horizontal |
| 2380.00 | 34.72 | 27.63 | 5.37 | 34.03 | 33.69 | 70.00 | -36.31 | Horizontal |
| 3490.00 | 36.43 | 28.93 | 6.93 | 32.77 | 39.52 | 74.00 | -34.48 | Horizontal |
| 4310.00 | 30.92 | 30.77 | 8.16 | 31.85 | 38.00 | 74.00 | -36.00 | Horizontal |
| 4955.00 | 30.39 | 31.91 | 8.73 | 32.16 | 38.87 | 74.00 | -35.13 | Horizontal |
| 5705.00 | 29.66 | 32.50 | 9.79 | 32.30 | 39.65 | 74.00 | -34.35 | Horizontal |

UTRA-FDD Mode

Peak measurement

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|
| 1595.00 | 36.14 | 24.99 | 4.74 | 33.76 | 32.11 | 70.00 | -37.89 | Vertical |
| 2460.00 | 35.86 | 27.49 | 5.45 | 33.94 | 34.86 | 70.00 | -35.14 | Vertical |
| 3465.00 | 35.63 | 28.87 | 6.89 | 32.79 | 38.60 | 74.00 | -35.40 | Vertical |
| 4270.00 | 31.05 | 30.58 | 8.12 | 31.88 | 37.87 | 74.00 | -36.13 | Vertical |
| 5035.00 | 29.52 | 31.98 | 8.81 | 32.20 | 38.11 | 74.00 | -35.89 | Vertical |
| 5685.00 | 28.69 | 32.47 | 9.77 | 32.31 | 38.62 | 74.00 | -35.38 | Vertical |
| 1515.00 | 35.85 | 25.20 | 4.69 | 33.62 | 32.12 | 70.00 | -37.88 | Horizontal |
| 2520.00 | 35.47 | 27.58 | 5.51 | 33.88 | 34.68 | 70.00 | -35.32 | Horizontal |
| 3610.00 | 32.56 | 29.14 | 7.17 | 32.62 | 36.25 | 74.00 | -37.75 | Horizontal |
| 4535.00 | 30.77 | 31.40 | 8.37 | 31.96 | 38.58 | 74.00 | -35.42 | Horizontal |
| 5295.00 | 29.08 | 31.72 | 9.22 | 32.33 | 37.69 | 74.00 | -36.31 | Horizontal |
| 5775.00 | 27.37 | 32.61 | 9.90 | 32.26 | 37.62 | 74.00 | -36.38 | Horizontal |

E-UTRA Mode
Peak measurement

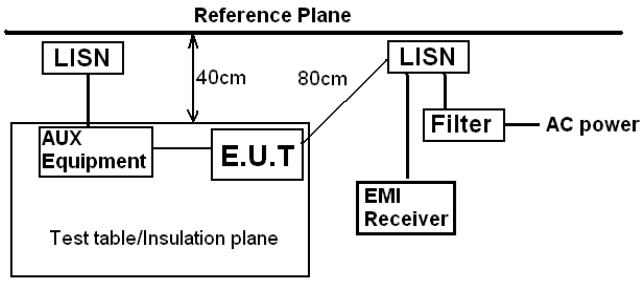
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|
| 1755.00 | 36.42 | 25.09 | 4.83 | 34.03 | 32.31 | 70.00 | -37.69 | Vertical |
| 2580.00 | 35.44 | 27.74 | 5.56 | 33.80 | 34.94 | 70.00 | -35.06 | Vertical |
| 3525.00 | 35.02 | 29.04 | 7.01 | 32.71 | 38.36 | 74.00 | -35.64 | Vertical |
| 4350.00 | 30.92 | 30.93 | 8.21 | 31.86 | 38.20 | 74.00 | -35.80 | Vertical |
| 5190.00 | 29.70 | 32.00 | 9.06 | 32.27 | 38.49 | 74.00 | -35.51 | Vertical |
| 5815.00 | 27.77 | 32.66 | 9.95 | 32.24 | 38.14 | 74.00 | -35.86 | Vertical |
| 1650.00 | 35.62 | 24.86 | 4.77 | 33.85 | 31.40 | 70.00 | -38.60 | Horizontal |
| 2535.00 | 35.59 | 27.60 | 5.52 | 33.86 | 34.85 | 70.00 | -35.15 | Horizontal |
| 3735.00 | 32.22 | 29.29 | 7.40 | 32.48 | 36.43 | 74.00 | -37.57 | Horizontal |
| 4790.00 | 31.23 | 31.76 | 8.59 | 32.08 | 39.50 | 74.00 | -34.50 | Horizontal |
| 5150.00 | 30.64 | 32.07 | 8.99 | 32.26 | 39.44 | 74.00 | -34.56 | Horizontal |
| 5340.00 | 28.59 | 31.73 | 9.29 | 32.35 | 37.26 | 74.00 | -36.74 | Horizontal |

LAN Mode
Peak measurement

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarity |
|---|---|---|---|---|---|---|---|---|
| 1955.00 | 35.63 | 25.95 | 4.94 | 34.37 | 32.15 | 70.00 | -37.85 | Vertical |
| 2735.00 | 35.00 | 28.23 | 5.70 | 33.63 | 35.30 | 70.00 | -34.70 | Vertical |
| 3525.00 | 35.02 | 29.04 | 7.01 | 32.71 | 38.36 | 74.00 | -35.64 | Vertical |
| 4320.00 | 32.01 | 30.77 | 8.17 | 31.85 | 39.10 | 74.00 | -34.90 | Vertical |
| 4925.00 | 29.78 | 31.89 | 8.70 | 32.15 | 38.22 | 74.00 | -35.78 | Vertical |
| 5705.00 | 29.17 | 32.50 | 9.79 | 32.30 | 39.16 | 74.00 | -34.84 | Vertical |
| 1260.00 | 36.94 | 25.55 | 4.51 | 33.18 | 33.82 | 70.00 | -36.18 | Horizontal |
| 1940.00 | 36.75 | 25.90 | 4.93 | 34.34 | 33.24 | 70.00 | -36.76 | Horizontal |
| 3120.00 | 36.99 | 28.78 | 6.19 | 33.18 | 38.78 | 74.00 | -35.22 | Horizontal |
| 4320.00 | 32.35 | 30.77 | 8.17 | 31.85 | 39.44 | 74.00 | -34.56 | Horizontal |
| 4800.00 | 30.05 | 31.78 | 8.60 | 32.09 | 38.34 | 74.00 | -35.66 | Horizontal |
| 5540.00 | 29.45 | 32.09 | 9.56 | 32.41 | 38.69 | 74.00 | -35.31 | Horizontal |

Remark:
1. The EUT was test at 3m in field chamber.
2.If the average limit is met when using a Peak detector, the EUT shall be deemed to meet both peak and average limits. And measurement with the average detector is unnecessary.

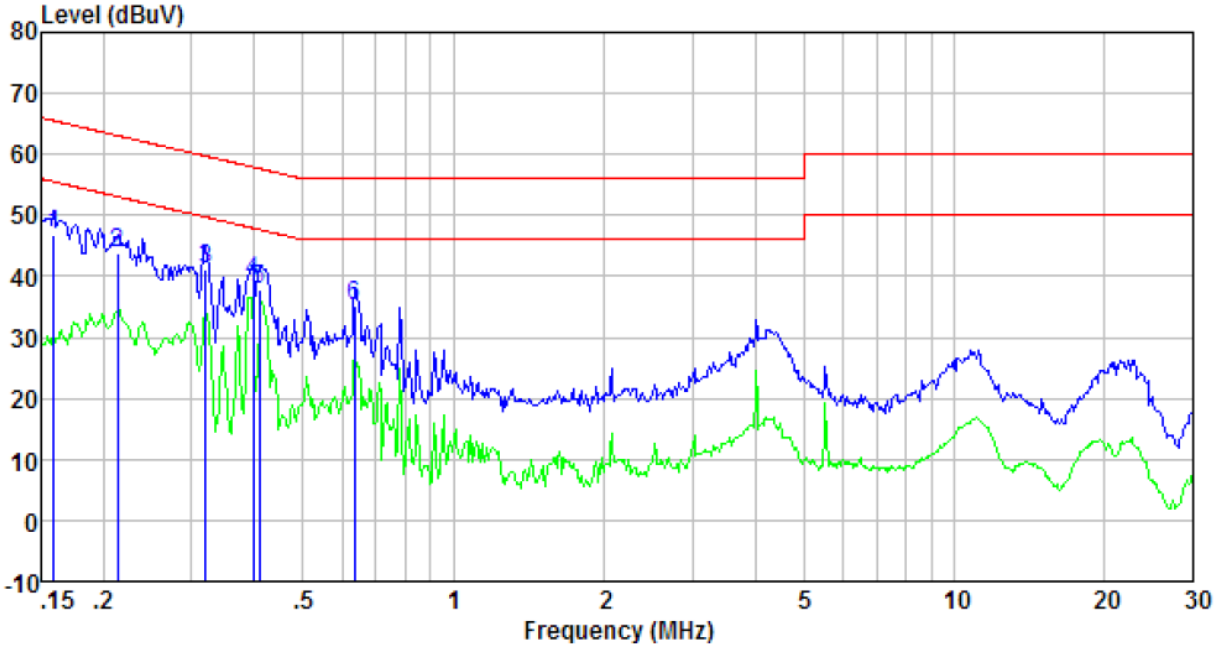
### 7.1.2 Conducted Emissions

| | |
|---|---|
| Test Requirement: | ETSI EN 301 489-17/-52, EN 55032 |
| Test Method: | ETSI EN 301 489-1 ;EN55032 |
| TestFrequencyRange: | 150kHz to 30MHz |
| Class / Severity: | Class B |
| Receiver setup: | RBW=9kHz, VBW=30kHz |
| Limit: | Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average<br>0.15-0.5: 66 to 56* / 56 to 46*<br>0.5-5: 56 / 46<br>5-30: 60 / 50<br>* Decreases with the logarithm of the frequency. |
| Test setup: |  <br>*Remark:*<br>*E.U.T: Equipment Under Test*<br>*LISN: Line Impedence Stabilization Network*<br>*Test table height=0.8m* |
| Test procedure | 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment.<br>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs).<br>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to EN55022 Class B on conducted measurement. |
| Test Instruments: | Temp.: 24°C \| Humid.: 51% \| Press.: 1010mbar |
| Measurement Record: | Uncertainty: ±3.45dB |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details, Only show test data of the worse mode on the test report. |
| Test results: | Pass |

**Measurement Data**

WIFI Mode

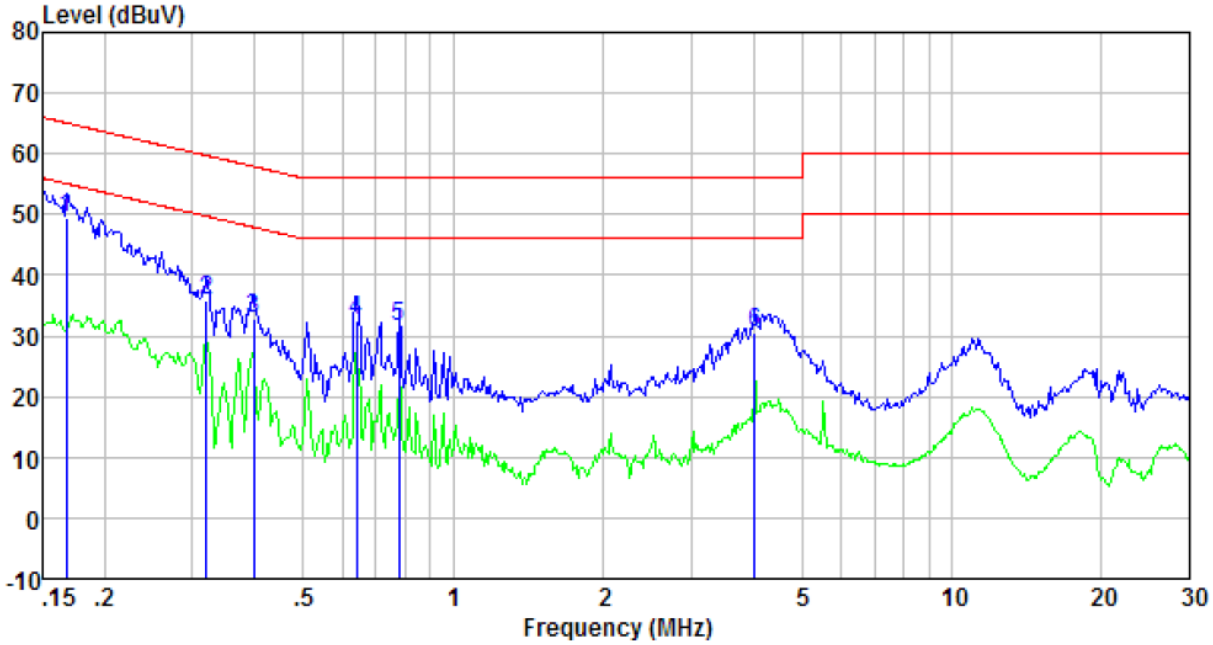
Line:




| Freq | Reading level | lISN/ISN factor | Cable loss | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dBuV/m | dB | dBuV/m | dB | |
| 0.159 | 46.27 | 0.42 | 0.12 | 46.81 | 65.52 | -18.71 | Peak |
| 0.213 | 43.17 | 0.43 | 0.13 | 43.73 | 63.10 | -19.37 | Peak |
| 0.320 | 40.49 | 0.44 | 0.10 | 41.03 | 59.71 | -18.68 | Peak |
| 0.398 | 38.50 | 0.42 | 0.11 | 39.03 | 57.90 | -18.87 | Peak |
| 0.408 | 37.20 | 0.41 | 0.11 | 37.72 | 57.68 | -19.96 | Peak |
| 0.634 | 34.83 | 0.30 | 0.13 | 35.26 | 56.00 | -20.74 | Peak |

Remarks:level = Reading level + Antenna factor + Cable loss

Neutral:

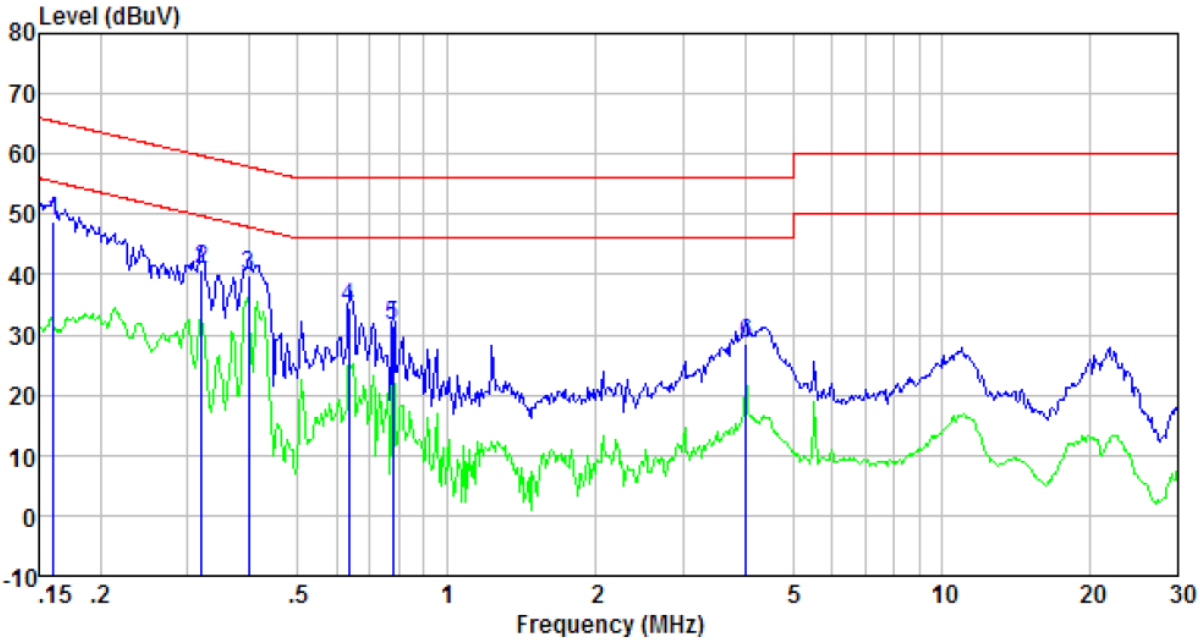



| Freq | Reading level | lISN/ISN factor | Cable loss | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dBuV/m | dB | dBuV/m | dB | |
| 0.168 | 48.82 | 0.41 | 0.12 | 49.35 | 65.08 | -15.73 | QP |
| 0.320 | 35.32 | 0.42 | 0.10 | 35.84 | 59.71 | -23.87 | QP |
| 0.398 | 32.34 | 0.39 | 0.11 | 32.84 | 57.90 | -25.06 | QP |
| 0.641 | 32.15 | 0.26 | 0.13 | 32.54 | 56.00 | -23.46 | QP |
| 0.779 | 31.16 | 0.23 | 0.13 | 31.52 | 56.00 | -24.48 | QP |
| 4.027 | 30.02 | 0.21 | 0.15 | 30.38 | 56.00 | -25.62 | QP |

Remarks:level = Reading level + Antenna factor + Cable loss

UTRA-FDD Mode

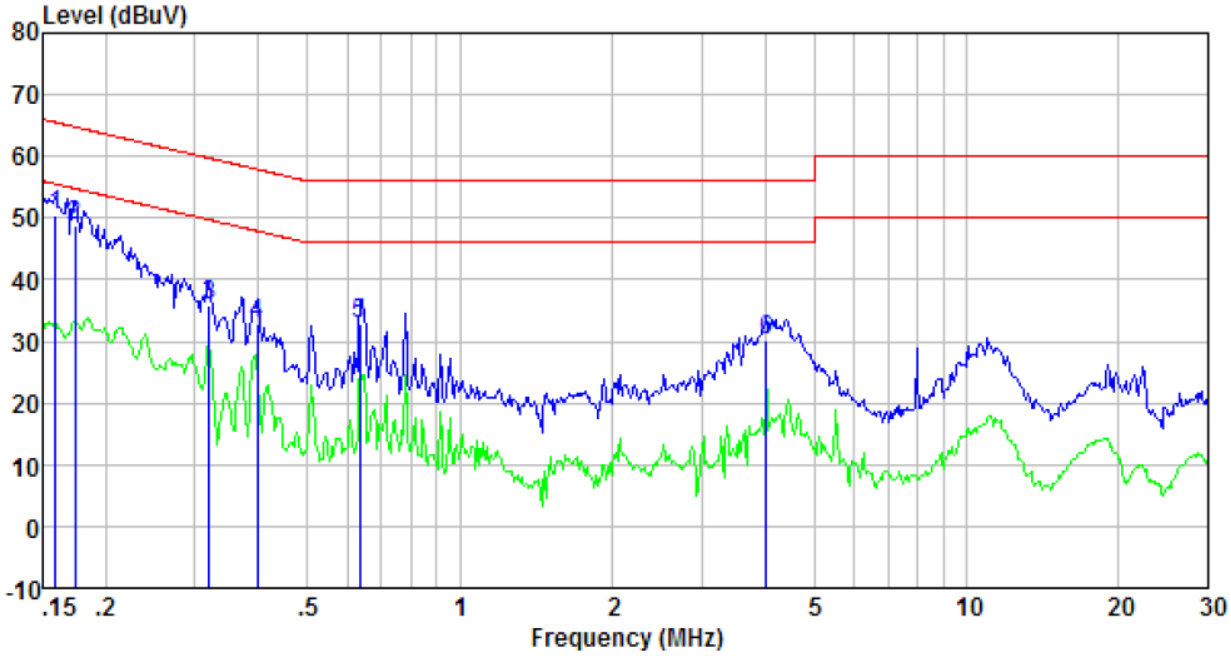
Line:




| Freq MHz | Reading level dBuV | lISN/ISN factor dB/m | Cable loss dBuV/m | level dB | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|
| 0.161 | 48.16 | 0.42 | 0.12 | 48.70 | 65.43 | -16.73 | QP |
| 0.320 | 40.22 | 0.44 | 0.10 | 40.76 | 59.71 | -18.95 | QP |
| 0.398 | 39.13 | 0.42 | 0.11 | 39.66 | 57.90 | -18.24 | QP |
| 0.634 | 34.08 | 0.30 | 0.13 | 34.51 | 56.00 | -21.49 | QP |
| 0.779 | 31.14 | 0.27 | 0.13 | 31.54 | 56.00 | -24.46 | QP |
| 4.027 | 28.14 | 0.21 | 0.15 | 28.50 | 56.00 | -27.50 | QP |

Remarks:level = Reading level + Antenna factor + Cable loss

Neutral:

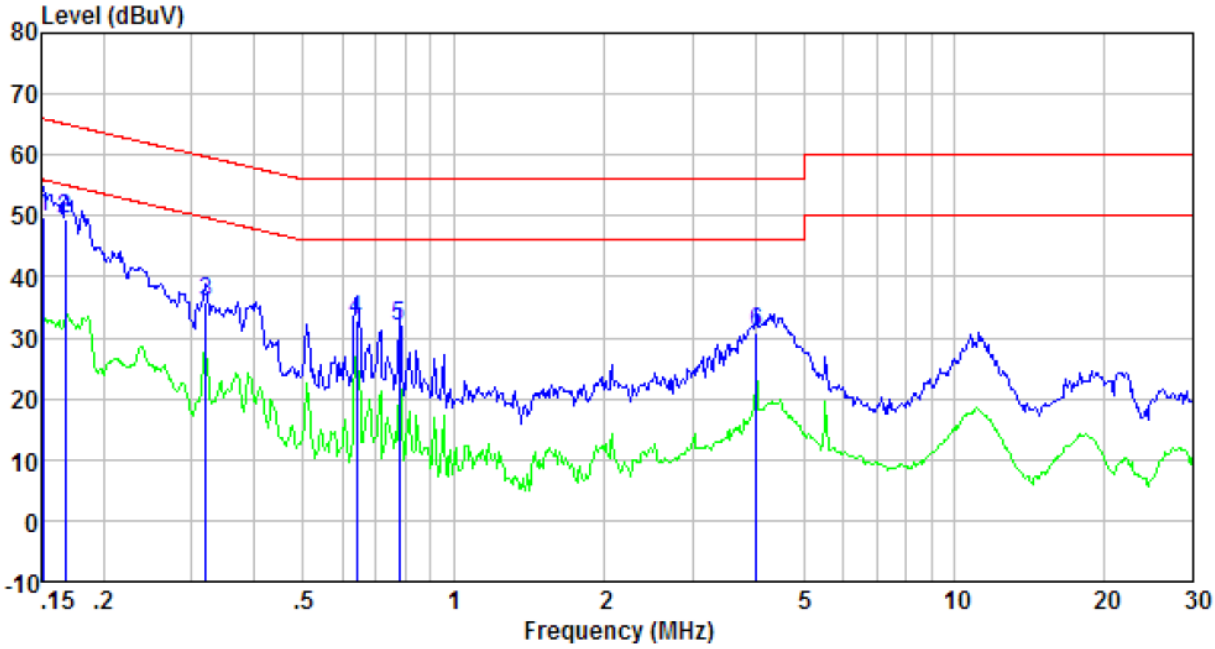



| Freq MHz | Reading level dBuV | lISN/ISN factor dB/m | Cable loss dBuV/m | level dB | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|
| 0.159 | 50.03 | 0.41 | 0.12 | 50.56 | 65.52 | -14.96 | QP |
| 0.174 | 48.32 | 0.41 | 0.13 | 48.86 | 64.77 | -15.91 | QP |
| 0.320 | 35.31 | 0.42 | 0.10 | 35.83 | 59.71 | -23.88 | QP |
| 0.398 | 32.44 | 0.39 | 0.11 | 32.94 | 57.90 | -24.96 | QP |
| 0.634 | 32.48 | 0.26 | 0.13 | 32.87 | 56.00 | -23.13 | QP |
| 4.027 | 29.78 | 0.21 | 0.15 | 30.14 | 56.00 | -25.86 | QP |

Remarks:level = Reading level + Antenna factor + Cable loss

E-UTRA Mode

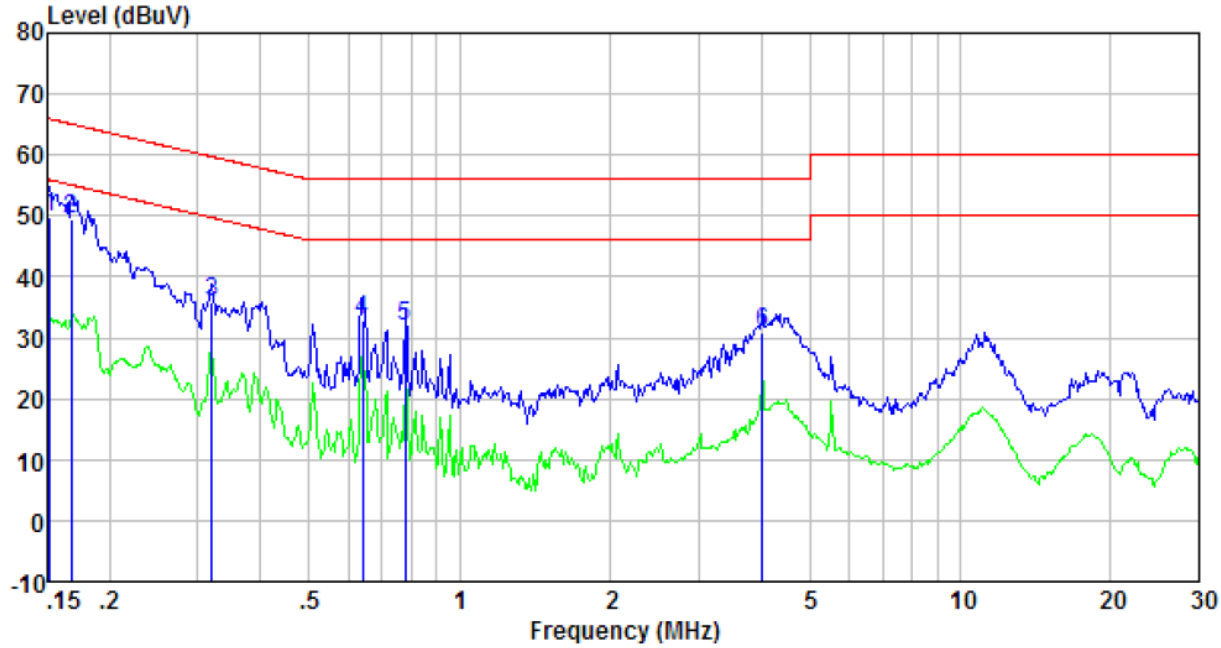
Line:




| Freq MHz | Reading level dBuV | lISN/ISN factor dB/m | Cable loss dBuV/m | level dB | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|
| 0.152 | 49.26 | 0.41 | 0.12 | 49.79 | 65.91 | -16.12 | QP |
| 0.168 | 48.97 | 0.41 | 0.12 | 49.50 | 65.08 | -15.58 | QP |
| 0.320 | 35.21 | 0.42 | 0.10 | 35.73 | 59.71 | -23.98 | QP |
| 0.641 | 32.29 | 0.26 | 0.13 | 32.68 | 56.00 | -23.32 | QP |
| 0.779 | 31.43 | 0.23 | 0.13 | 31.79 | 56.00 | -24.21 | QP |
| 4.027 | 30.64 | 0.21 | 0.15 | 31.00 | 56.00 | -25.00 | QP |

Remarks:level = Reading level + Antenna factor + Cable loss

Neutral:

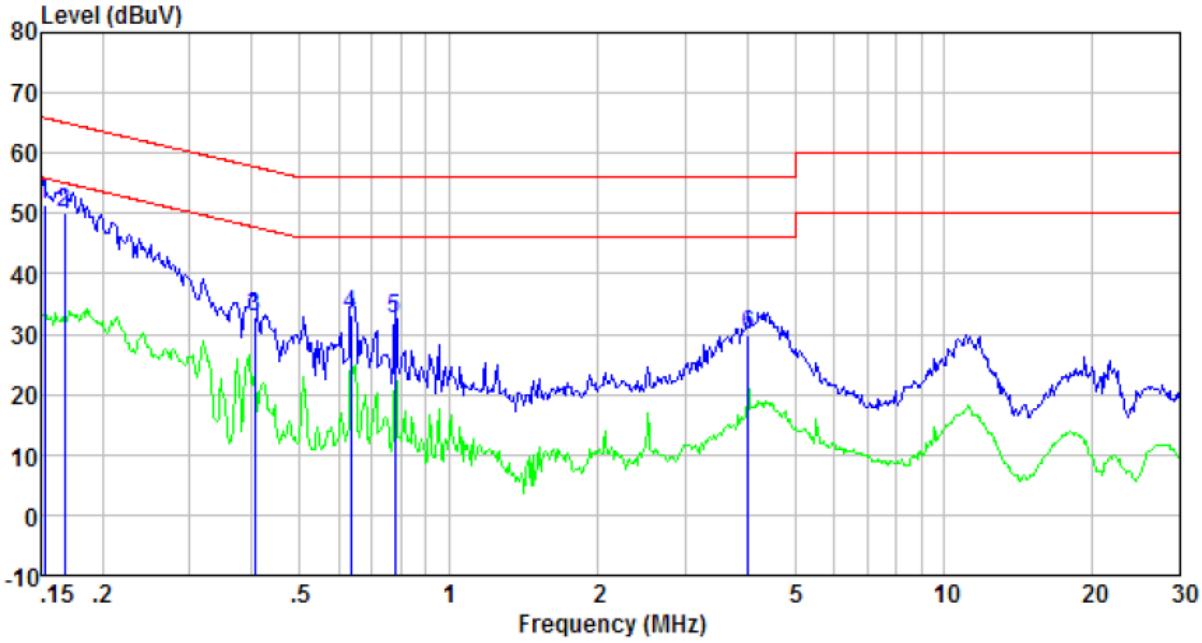



| Freq MHz | Reading level dBuV | lISN/ISN factor dB/m | Cable loss dBuV/m | level dB | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|
| 0.152 | 49.26 | 0.41 | 0.12 | 49.79 | 65.91 | -16.12 | QP |
| 0.168 | 48.97 | 0.41 | 0.12 | 49.50 | 65.08 | -15.58 | QP |
| 0.320 | 35.21 | 0.42 | 0.10 | 35.73 | 59.71 | -23.98 | QP |
| 0.641 | 32.29 | 0.26 | 0.13 | 32.68 | 56.00 | -23.32 | QP |
| 0.779 | 31.43 | 0.23 | 0.13 | 31.79 | 56.00 | -24.21 | QP |
| 4.027 | 30.64 | 0.21 | 0.15 | 31.00 | 56.00 | -25.00 | QP |

Remarks:level = Reading level + Antenna factor + Cable loss

LAN Mode

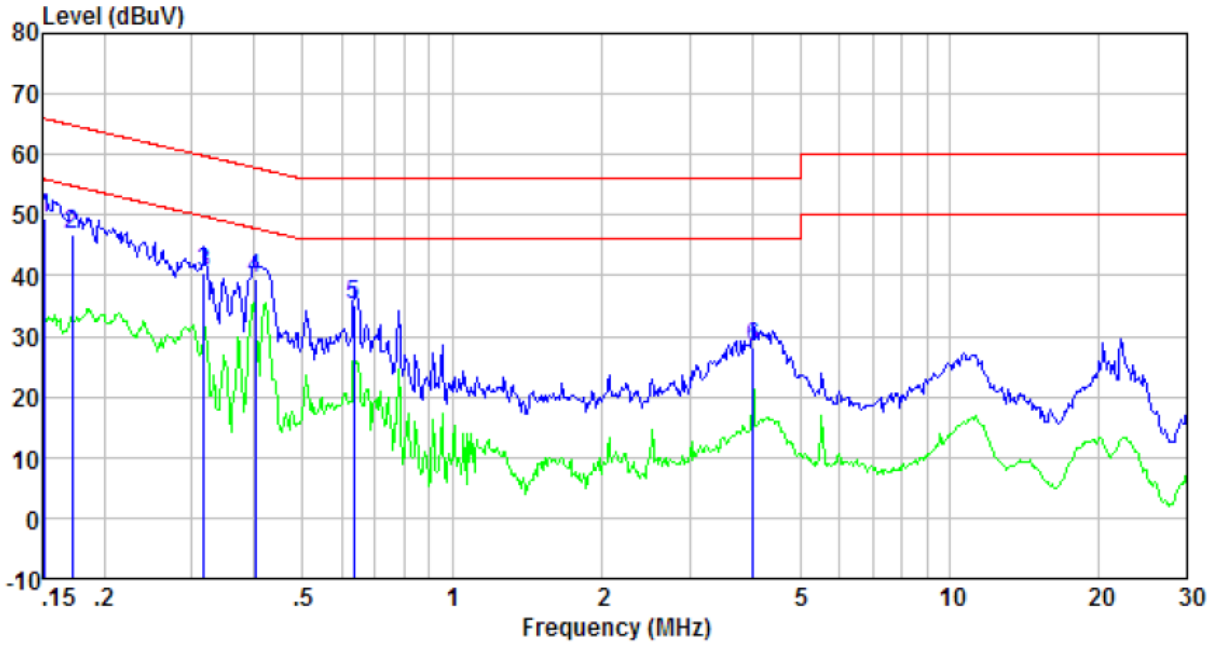
Line:




| Freq | Reading level | lISN/ISN factor | Cable loss | level | Limit level | Over limit | Remark |
|---|---|---|---|---|---|---|---|
| MHz | dBuV | dB/m | dBuV/m | dB | dBuV/m | dB | |
| 0.152 | 51.03 | 0.41 | 0.12 | 51.56 | 65.87 | -14.31 | QP |
| 0.168 | 49.70 | 0.41 | 0.12 | 50.23 | 65.08 | -14.85 | QP |
| 0.406 | 32.23 | 0.39 | 0.11 | 32.73 | 57.73 | -25.00 | QP |
| 0.634 | 32.81 | 0.26 | 0.13 | 33.20 | 56.00 | -22.80 | QP |
| 0.779 | 32.08 | 0.23 | 0.13 | 32.44 | 56.00 | -23.56 | QP |
| 4.027 | 29.40 | 0.21 | 0.15 | 29.76 | 56.00 | -26.24 | QP |

Remarks:level = Reading level + Antenna factor + Cable loss

Neutral:




| Freq MHz | Reading level dBuV | lISN/ISN factor dB/m | Cable loss dBuV/m | level dB | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|
| 0.152 | 49.03 | 0.42 | 0.12 | 49.57 | 65.91 | -16.34 | QP |
| 0.172 | 46.30 | 0.42 | 0.12 | 46.84 | 64.86 | -18.02 | QP |
| 0.317 | 40.09 | 0.44 | 0.10 | 40.63 | 59.80 | -19.17 | QP |
| 0.402 | 38.98 | 0.42 | 0.11 | 39.51 | 57.81 | -18.30 | QP |
| 0.634 | 34.58 | 0.30 | 0.13 | 35.01 | 56.00 | -20.99 | QP |
| 4.027 | 27.97 | 0.21 | 0.15 | 28.33 | 56.00 | -27.67 | QP |

Remarks:level = Reading level + Antenna factor + Cable loss

*Notes:*

1. An initial pre-scan was performed on the live and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. *If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.*

### 7.1.3 Harmonics Test Results

| | |
|---|---|
| Test Requirement: | ETSI EN 301 489-17/-52, EN 61000-3-2 |
| Test Method: | N/A: See Remark Below |
| Remark: | There is no need for Harmonics test to be performed on this product(rated power is less than 75W) in accordance with EN 61000-3-2. For further details, please refer to Clause 7, Note 1 of EN 61000-3-2<br>Which states:<br>"For the following categories of equipment limits are not specified in this edition of the standard.<br>Note 1: Equipment with a rated power of 75W or less, other than lighting equipment." |

### 7.1.4 Flicker Test Results

| | | | | | | |
|---|---|---|---|---|---|---|
| Test Requirement: | ETSI EN 301 489-17/-24, EN 61000-3-3 | | | | | |
| Test Method: | EN 61000-3-3 | | | | | |
| Class/Severity: | Clause 5 of EN 61000-3-3 | | | | | |
| Measurement Time: | 10 min | | | | | |
| Detector: | As per EN 61000-3-3 | | | | | |
| Test Instruments: | Temp.: | 24°C | Humid.: | 51% | Press.: | 1010mbar |
| Test Instruments: | Refer to section 6.0 for details | | | | | |
| Test mode: | Refer to section 5.3 for details, Only show test data of the worse mode on the test report. | | | | | |
| Test results: | Pass | | | | | |

**Measurement Data**

Test Data of Voltage Fluctuation and Flicker

| | |
|---|---|
| Final Test Result | Pass |
| Nominal Voltage | 230 V |
| Nominal Frequency | 50 Hz |
| Plt Test Duration | 600 s |
| Flicker Margin | 10 % |
| d Measurement Margin | 10 % |

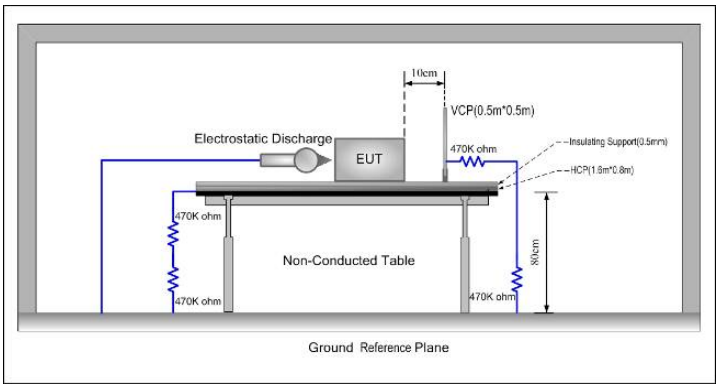
| Segment | Pst | dmax(%) | dc(%) | d(t)>3.3%(ms) | Judge |
|---|---|---|---|---|---|
| Limit | 1.000 | 4.000 | 3.300 | 500 | |
| Seg. 1 | 0.006 | 0.039 | 0.009 | 0 | Pass |

| Plt | Value | Judge |
|---|---|---|
| Limit | 0.650 | |
| Measurement | 0.003 | Pass |

## 7.2 Immunity

| Performance Criteria of ETSI EN 301 489-17/52, EN 55024 clause 6 | |
|---|---|
| Continuous phenomena applied to transmitters (CT) | 1. During the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).<br>2. At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained.<br>3. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate. |
| Transient phenomena applied to Transmitters (TT) | 1. At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.<br>2. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained.<br>3. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate. |
| Continuous phenomena applied to Receivers (CR) | 1. During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence.<br>2. During the test, the downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).<br>3. At the conclusion of the test, the EUT shall operate as intended with no loss of user control the The communication link shall have been maintained. |
| Transient phenomena applied to Receivers (TR) | 1. At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link.<br>2. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained |
| Ancillary equipment tested on a stand alone basis | If ancillary equipment is intended to be tested on a stand alone basis, the performance criteria described in the clauses above are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. |

### 7.2.1 Electrostatic Discharge

| | |
|---|---|
| Test Requirement: | ETSI EN 301489-17/-52, EN 55024 |
| Test Method: | EN61000-4-2 |
| Discharge Voltage: | Contact Discharge: ±2kV, ±4kV<br>Air Discharge: ±2kV, ±4kV, ±8kV<br>HCP/VCP: ±2kV, ±4kV |
| Polarity: | Positive & Negative |
| Number of Discharge: | Contact Discharge: Minimum 25 times at each test point,<br>Air Discharge: Minimum 10 times at each test point. |
| Discharge Mode: | Single Discharge |
| Discharge Period: | 1 second minimum |
| Limit: | Criteria B |
| Test setup: |  |
| Test Procedure: | **Air discharge:**<br>1. The test was applied on non-conductive surfaces of EUT.<br>2. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.<br>3. After each discharge, the discharge electrode was removed from the EUT.<br>4. The generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point.<br>5. This procedure was repeated until all the air discharge completed<br>**Contact Discharge:**<br>1. The test was applied on conductive surfaces of EUT.<br>2. the generator was re-triggered for a new single discharge and repeated 10 times for each pre-selected test point.<br>3. the tip of the discharge electrode was touch the EUT before the discharge switch was operated.<br>**Indirect discharge for horizontal coupling plane**<br>1. At least 10 single discharges shall be applied at the front edge of each HCP opposite the centre point of each unit of the EUT and 0.1m from the front of the EUT.<br>2. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.<br>3. Consideration should be given to exposing all sides of the EUT.<br>**Indirect discharge for vertical coupling plane** |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 1. At least 10 single discharges were applied to the center of one vertical edge of the coupling plane.<br>2. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT.<br>3. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated. | | | | | |
| Test environment: | Temp.: | 24°C | Humid.: | 51% | Press.: | 1010mbar |
| Test Instruments: | Refer to section 6.0 for details | | | | | |
| Test mode: | Refer to section 5.3 for details | | | | | |
| Test results: | Pass | | | | | |

**Measurement Record:**

| Test points: | I: All of the metal part |
|---|---|
| | II: N/A |

**Direct discharge**

| Discharge Voltage (KV) | Type of discharge | Test points | ObservationsPerformance | Result |
|---|---|---|---|---|
| ± 2, ± 4 | Contact | I | A | Pass |
| ± 2, ± 4,± 8 | Air | II | N/A | N/A |

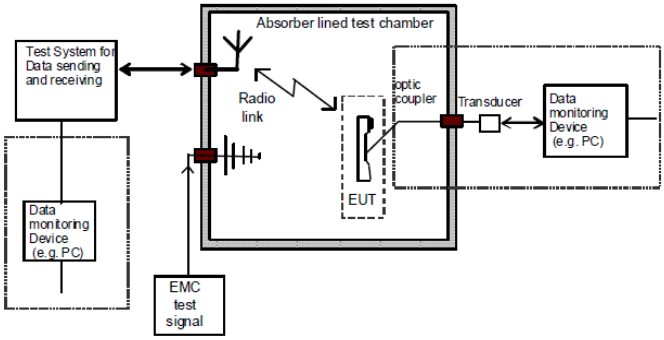
**Indirect discharge**

| Discharge Voltage (KV) | Type of discharge | Test points | Observation Performance | Result |
|---|---|---|---|---|
| ± 2, ± 4 | HCP-Bottom/Top/ Front/Back/Left/Right | Edge of the HCP | A | Pass |
| ± 2, ± 4 | VCP-Front/Back /Left/Right | Center of the VCP | A | Pass |

Remark:

A:Normal performance within the specification limits.

### 7.2.2 Radiated Immunity

| | |
|---|---|
| Test Requirement: | ETSI EN 301489-17/-52, EN 55024 |
| Test Method: | EN 61000-4-3 |
| Frequency range: | 80MHz to 1GHz, 1.0GHz to 6.0GHz |
| Test Level: | 3V/m |
| Modulation: | 80%, 1kHz Amplitude Modulation |
| Performance Criterion: | Criteria A |
| Test setup: |  |
| Test Procedure: | 1. For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items.<br>2. If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length.<br>3. The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area).<br>4. The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary.Where the frequency range was swept incrementally, the step size was not exceed 1 % of the preceding frequency value.<br>5. The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0,5 s.<br>6. The test normally was performed with the generating antenna facing each side of the EUT.<br>7. The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.<br>8. The EUT was performed in a configuration to actual installation conditions, a video camera and/or a audio monitor were used to monitor the performance of the EUT. |

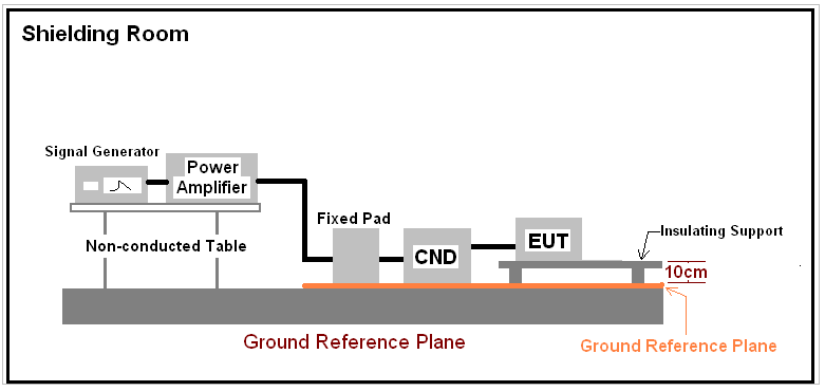
| | | | | | | |
|---|---|---|---|---|---|---|
| Test monitor: | **Traffic mode:**<br>Uplink level, downlink level, RX quality | | | | | |
| | **Idle mode:**<br>1. The test system shall simulate a Base Station (BS) with Broadcast Control Channel/Common Control Channel (BCCH/CCCH) on one carrier.<br>2. The EUT shall be synchronized to the BCCH, listening to the CCCH and able to respond to paging messages. | | | | | |
| Test environment: | Temp.: | 25°C | Humid.: | 52% | Press.: | 1010mbar |
| Test Instruments: | Refer to section 6.0 for details | | | | | |
| Test results: | Pass | | | | | |

**Measurement Record:**

| Frequency | Level | Modulation | Operating Mode | Antenna Polarization | EUT Face | Observations (Performance Criterion) |
|---|---|---|---|---|---|---|
| 80 MHz-1 GHz<br>1.0GHz-6.0GHz | 3 V/m | 1 kHz, 80 % Amp. Mod, 10 % increment, dwell time=3seconds | Idle mode | V | Front | A |
| | | | | H | | A |
| | | | | V | Rear | A |
| | | | | H | | A |
| | | | | V | Left | A |
| | | | | H | | A |
| | | | | V | Right | A |
| | | | | H | | A |
| | | | | V | Top | A |
| | | | | H | | A |
| | | | | V | Bottom | A |
| | | | | H | | A |

Remarks:
A: normal performance within the specification limits

### 7.2.3 Radio frequency common mode

| | | | | | | |
|---|---|---|---|---|---|---|
| Test Requirement: | ETSI EN 301489-17/-52, EN 55024 | | | | | |
| Test Method: | EN61000-4-6 | | | | | |
| Frequency range: | 0.15MHz to 80MHz | | | | | |
| Test Level: | 3V rms on AC Ports (unmodulated emf into 150 Ω) | | | | | |
| Modulation: | 80%, 1kHz Amplitude Modulation | | | | | |
| Performance Criterion: | Criteria A | | | | | |
| Test setup: |  | | | | | |
| Test Procedure: | 1. Let the EUT work in test mode and test it.<br>2. The EUT are placed on an insulating support 0.1m high above a groundreference plane. CDN (coupling and decoupling device) is placed on theground plane about 0.3m from EUT. Cables between CDN and EUT are asshort as possible, and their height above the ground reference plane shall bebetween 30 and 50 mm (where possible).<br>3. The disturbance signal described below is injected to EUT through CDN.<br>4. The EUT operates within its operational mode(s) under intended climaticconditions after power on.<br>5. The frequency range is swept from 0.150MHz to 80MHz using 3V signal level,and with the disturbance signal 80% amplitude modulated with a 1kHz sinewave.The rate of sweep shall not exceed $1.5*10^{-3}$decades/s. Where the frequency isswept incrementally; the step size shall not exceed 1% of the start andthereafter 1% of the preceding frequency value.<br>6. Recording the EUT operating situation during compliance testing and decidethe EUT immunity criterion. | | | | | |
| Test environment: | Temp.: | 24°C | Humid.: | 51% | Press.: | 1010mbar |
| Test Instruments: | Refer to section 6.0 for details | | | | | |
| Test results: | Pass | | | | | |

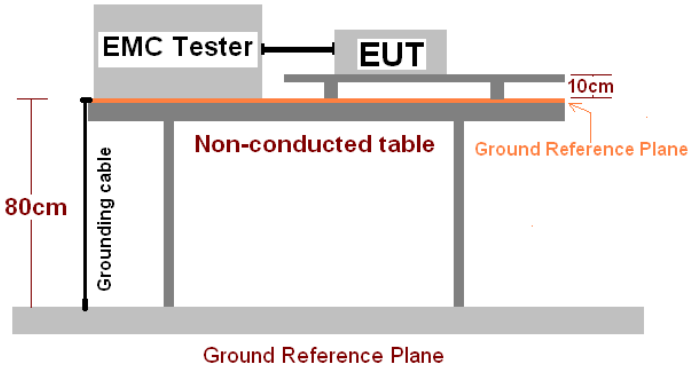
**Measurement Record:**

| Frequency | Injected Position | Test Level | Modulation | Step Size | Dwell Time | Observations (Performance Criterion) |
|---|---|---|---|---|---|---|
| 150kHz to 80MHz | AC Main | 3Vrms | 80%, 1kHz Amp. Mod. | 1% | 2s | A |

Remark:

A:Normal performance within the specification limits.

### 7.2.4 Electrical Fast Transients

| | |
|---|---|
| Test Requirement: | ETSI EN 301489-17/-52, EN 55024 |
| Test Method: | EN 61000-4-4 |
| Test Level: | 1.0kV on AC port |
| Polarity: | Positive & Negative |
| Repetition Frequency: | 5kHz |
| Burst Duration: | 15ms |
| Burst Period: | 300ms |
| Test Duration: | 2 minute per level & polarity |
| Performance Criterion: | B |
| Test setup: |  |
| Test Procedure: | 1. The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support 0.1m + 0.01m thick. The ground reference plane was 1m*1m metallic sheet with 0.65mm minimum thickness.<br>2. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m.<br>3. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.<br>4. The length of the signal and power lines between the coupling device and the EUT is 0.5m<br>**Test on SignalPorts, TelecommunicationPorts and ControlPorts:**<br>The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 2 minutes.<br>**Test on power supply ports:**<br>1. The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal.<br>2. Each of the Line and Neutral conductors is impressed with burst noise for 2 minutes. |
| Test environment: | Temp.: 26°C \| Humid.: 54% \| Press.: 1010mbar |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details |

| Test results: | Pass |
|---|---|

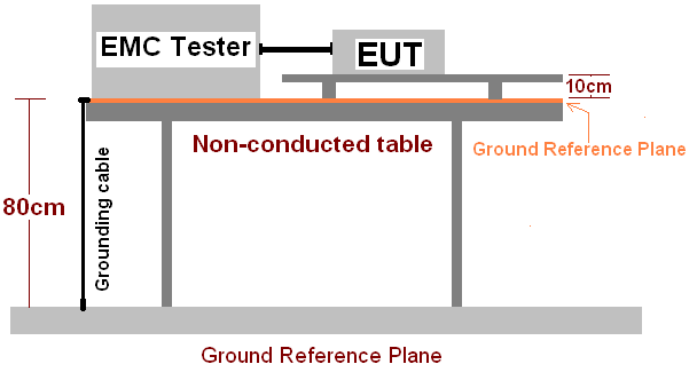
**Measurement Record:**

| Lead under Test | Level (±kV) | Coupling Direct/Clamp | Observations (Performance Criterion) | Result |
|---|---|---|---|---|
| L | ± 1.0 | Direct | A | Pass |
| N | ± 1.0 | Direct | A | Pass |
| L-N | ± 1.0 | Direct | A | Pass |

Remark:

A: Normal performance within the specification limits

### 7.2.5 Surge

| | |
|---|---|
| Test Requirement: | ETSI EN 301489-17/-52, EN 55024 |
| Test Method: | ETSI EN61000-4-5 |
| Test Level: | ±1kV Live to Neutral: Differential mode |
| Polarity: | Positive & Negative |
| Test Interval: | 60s between each surge |
| No. of surges: | 5 positive, 5 negative at 0°, 90°, 180°, 270°. |
| Performance Criterion: | B |
| Test setup: |  |
| Test Procedure: | 1. For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.<br>2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.<br>3. Different phase angles are done individually.<br>4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test. |

| | | | | | | |
|---|---|---|---|---|---|---|
| Test environment: | Temp.: | 26°C | Humid.: | 53% | Press.: | 1010mbar |
| Test Instruments: | Refer to section 6.0 for details | | | | | |
| Test mode: | Refer to section 5.3 for details | | | | | |
| Test results: | Pass | | | | | |

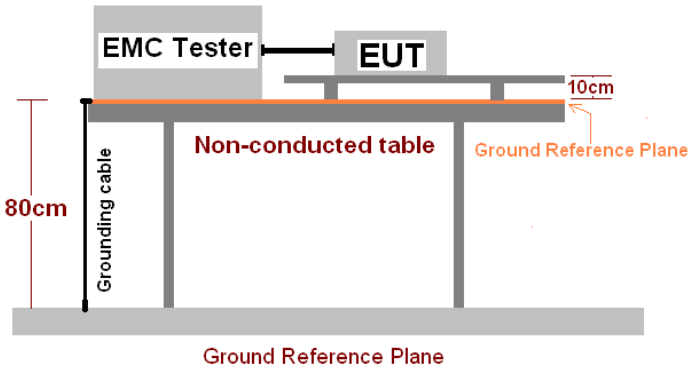
**Measurement Record:**

| Location | Level(kV) | Pulse No | Surge Interval | Phase(deg) | Observations (Performance Criterion) |
|---|---|---|---|---|---|
| L-N | ± 1 | 5 | 60s | 0° | A |
| | | | | 90° | A |
| | | | | 180° | A |
| | | | | 270° | A |

Remark:

A.Normal performance within the specification limits

### 7.2.6 Voltage Dip and Voltage Interruptions

| | |
|---|---|
| Test Requirement: | ETSI EN 301489-17/-52, EN 55024 |
| Test Method: | EN61000-4-11 |
| Test Level: | 0% of VT(Supply Voltage) for 0.5 period<br>0% of VT(Supply Voltage) for 1.0 period<br>70% of VT(Supply Voltage) for 25 period<br>0% of VT(Supply Voltage) for 250 period |
| No. of Dips / Interruptions: | 3 per Level |
| Performance Criterion: | 0% VD, 0.5 period----Performance criterion: B<br>0% VD, 1 period----Performance criterion: B<br>70% VD, 25 period----Performance criterion: C<br>0% VI, 250 period----Performance criterion: C |
| Test setup: |  |
| Test Procedure: | 1>.The EUT and test generator were setup as shown on above setup photo.<br>2>.The interruptions are introduced at selected phase angles with specified duration.<br>3>.Record any degradation of performance. |
| Test environment: | Temp.: 26°C \| Humid.: 53% \| Press.: 1010mbar |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

**Measurement Record:**

| Test Level $U_T$ | Duration (Periods) | Phase angle | No of dropout | Time between dropout | Observations (Performance Criterion) |
|---|---|---|---|---|---|
| 0% | 0.5 | 0°, 90°, 180°, 270° | 3 | 10s | A |
| 0% | 1.0 | 0°, 90°, 180°, 270° | 3 | 10s | A |
| 70% | 25 | 0°, 90°, 180°, 270° | 3 | 10s | A |
| 0% | 250 | 0°, 90°, 180°, 270° | 3 | 10s | B |

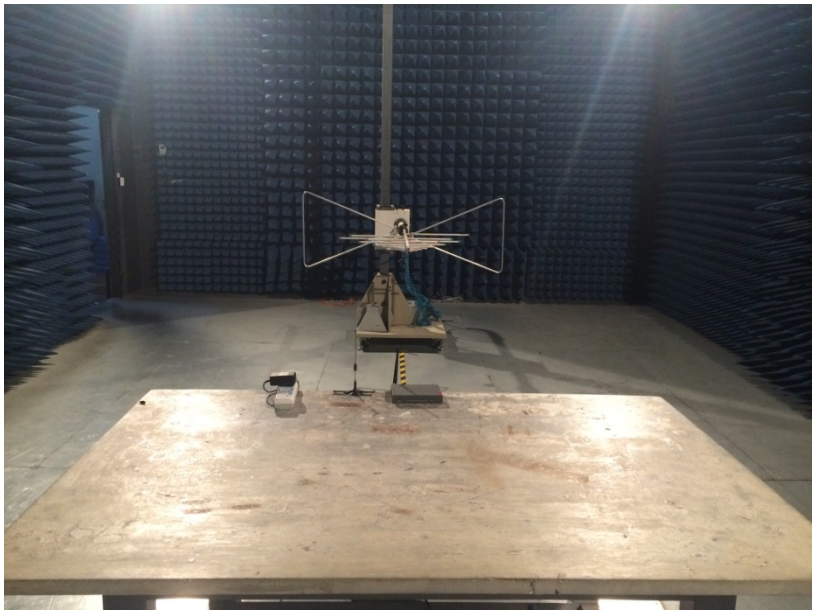
Remark:

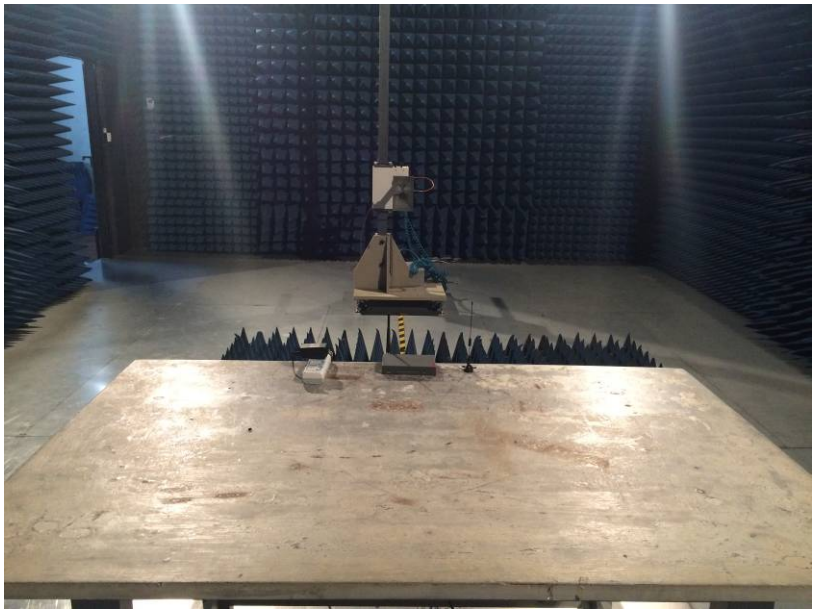
A: No loss of function was observed.

B: During the test, the charging stopped, but after the test, the power charger can automatically return to normal

# 8 Test Setup Photo

Radiated Emission

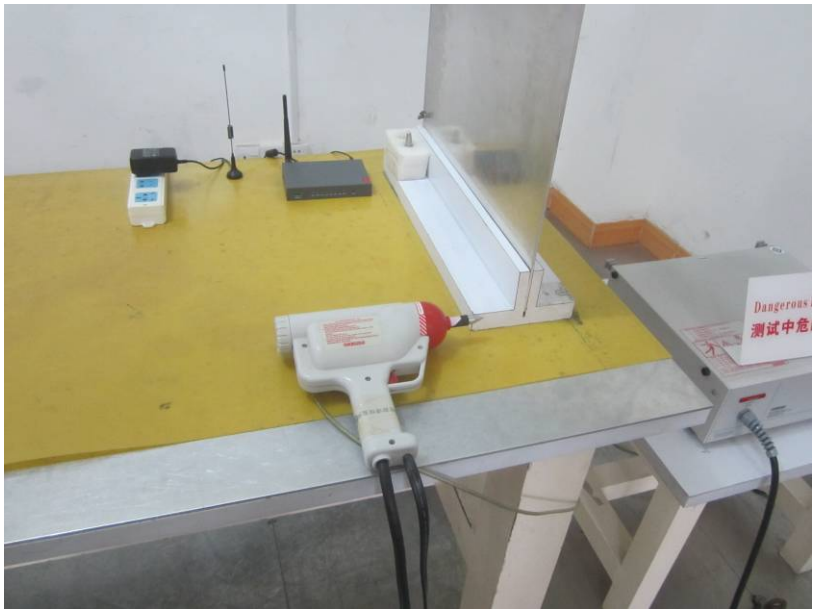




Conducted Emission

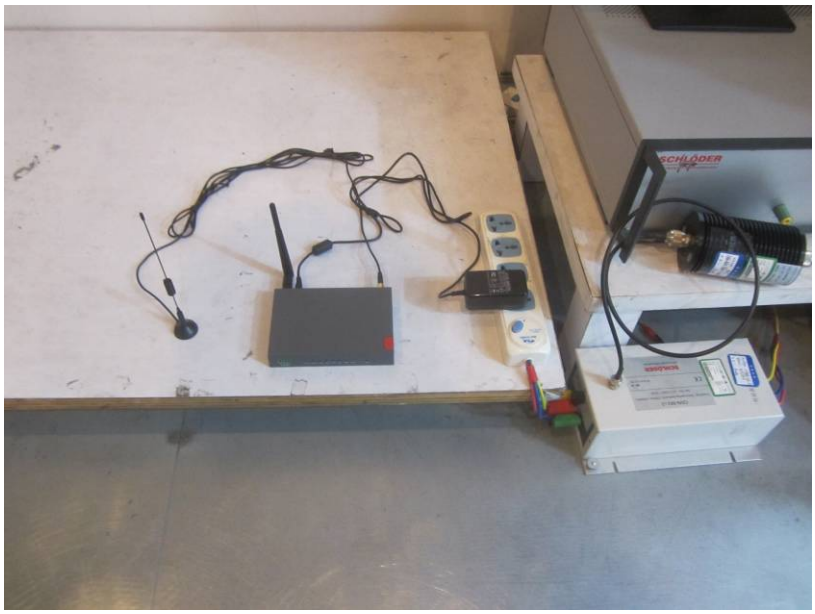
Flicker

ESD



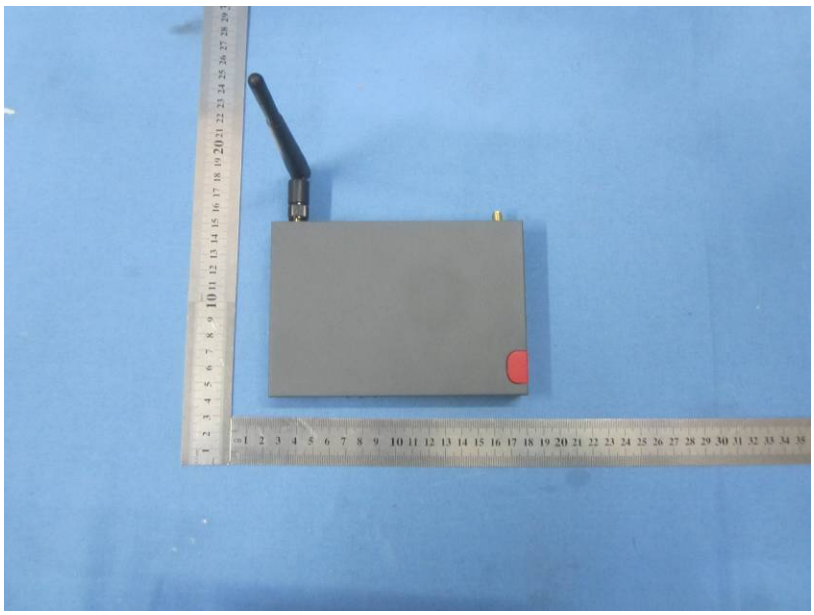
Surges/EFT/V-dips

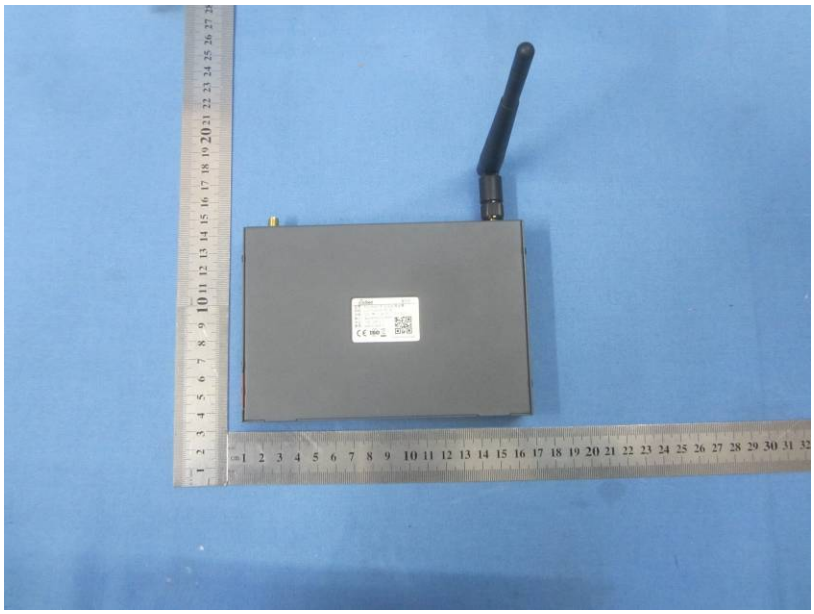
CS



RS

# 9 EUT Constructional Details



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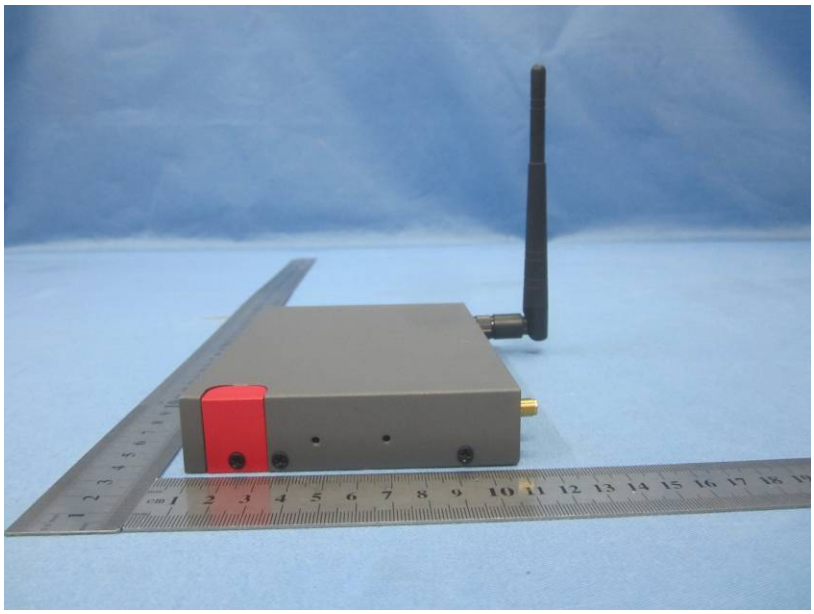
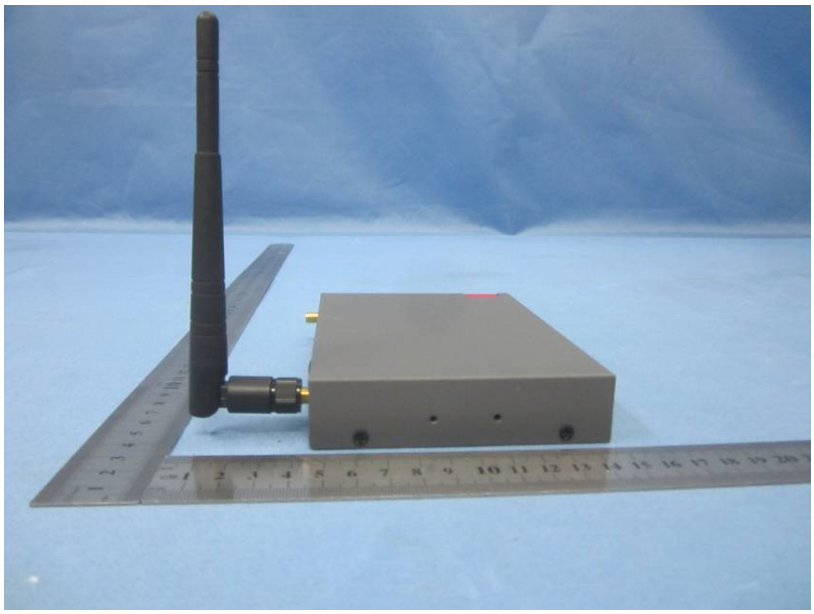
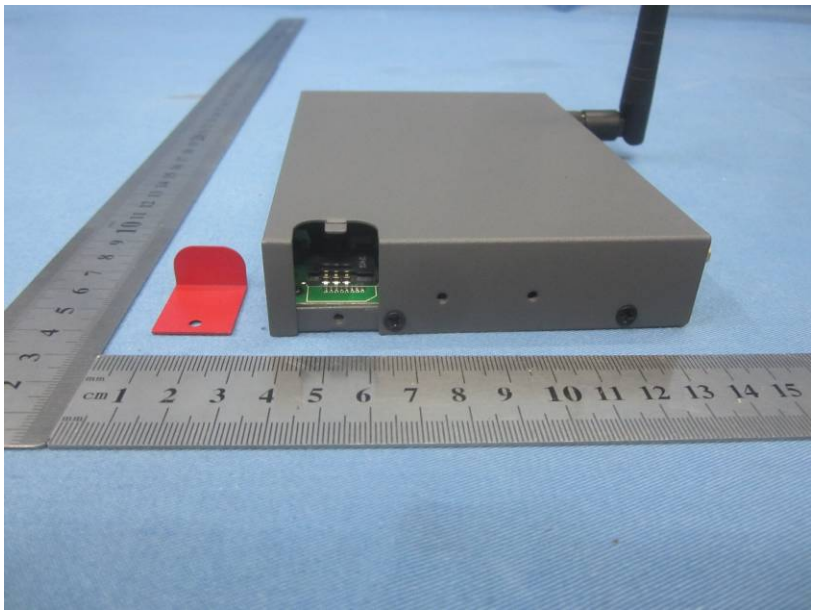
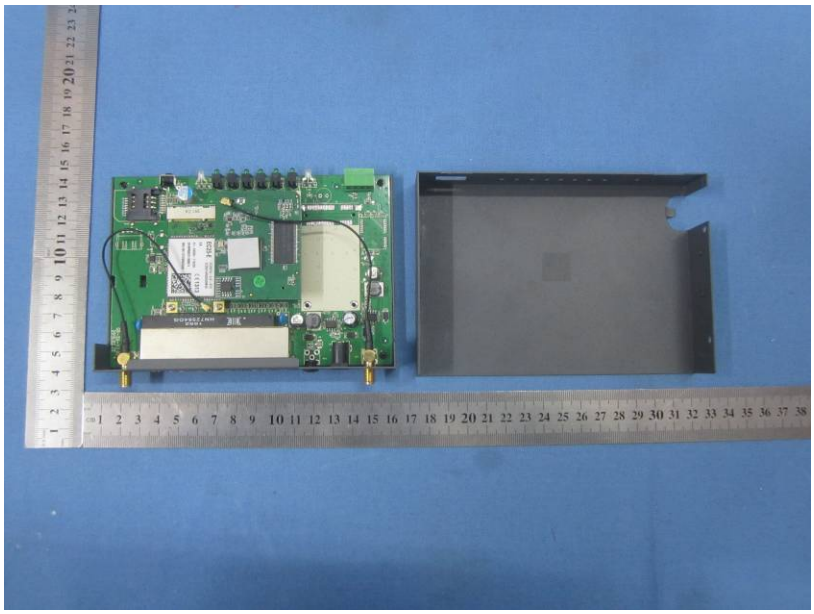
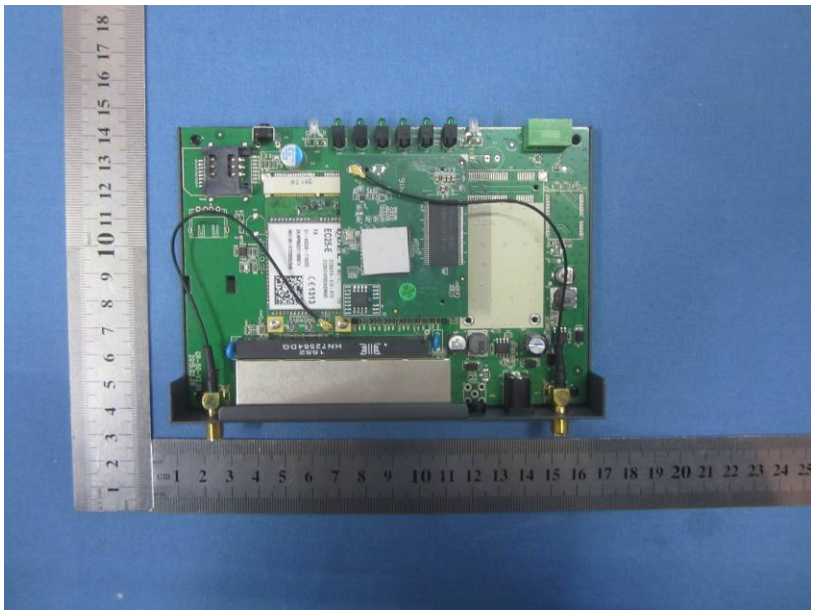
RST

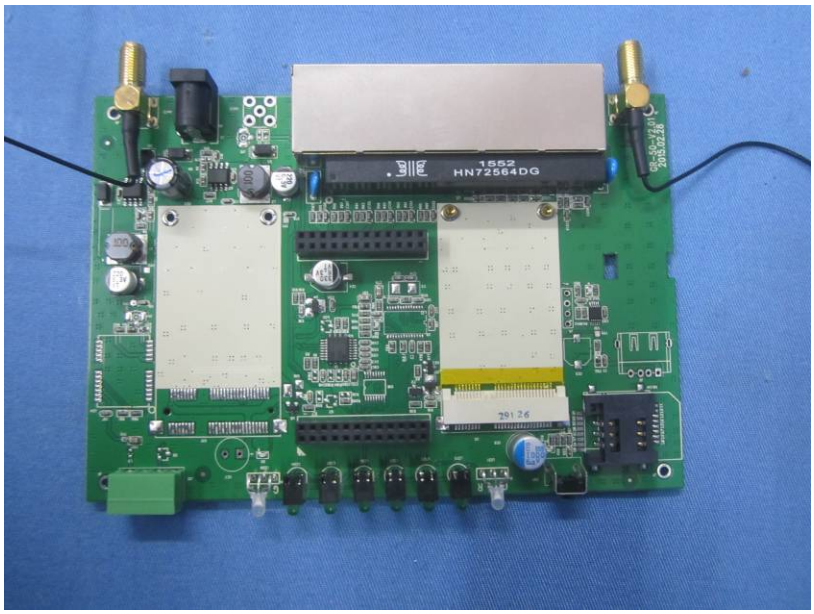








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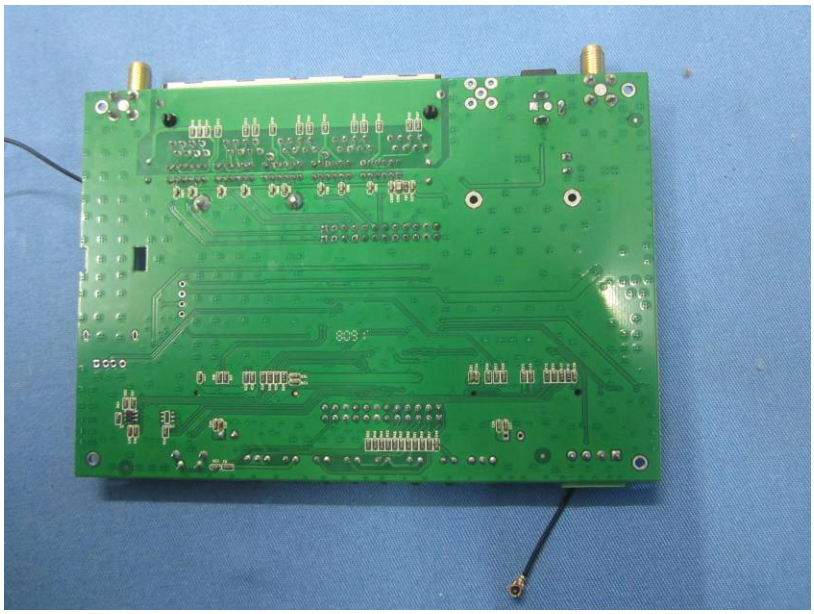

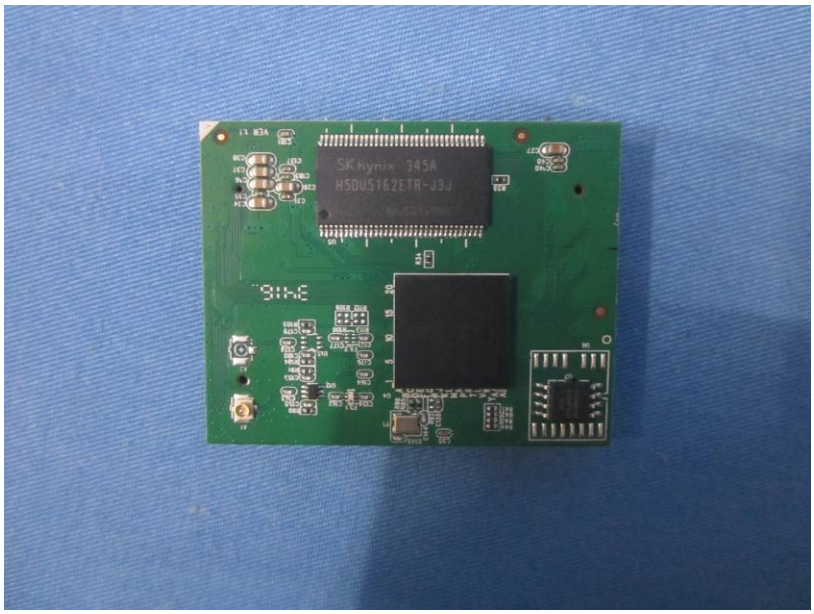
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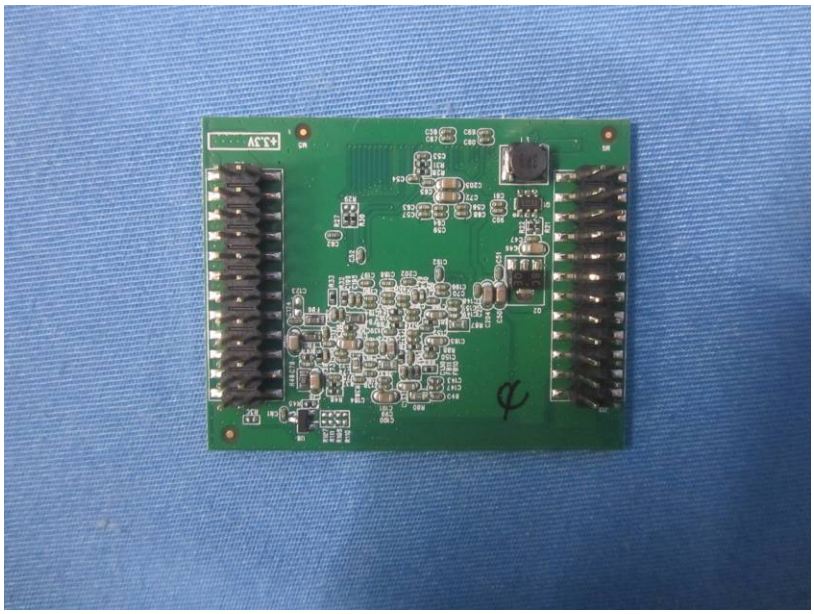


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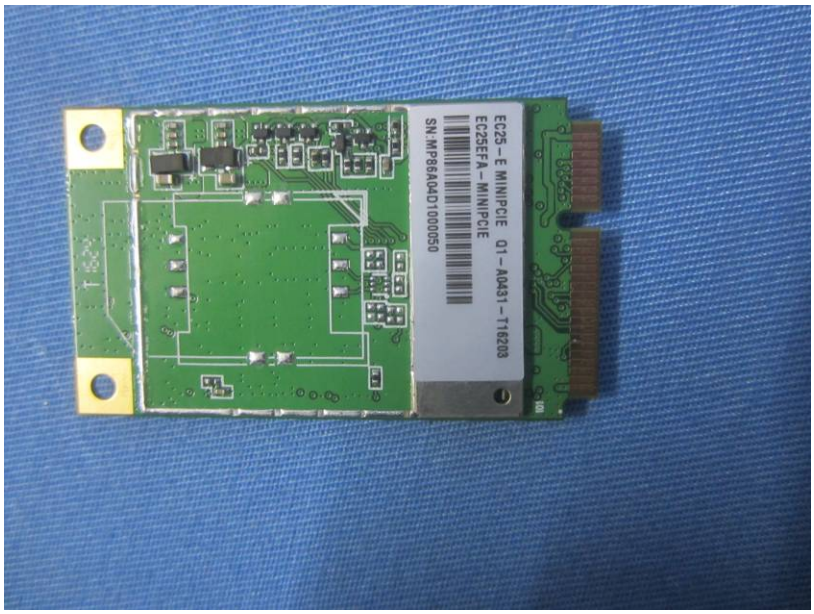
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OUTPUT:12V 1.5A
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I.T.E. POWER SUPPLY
E352163
LPS
SHENZHEN TRANSIN TECHNOLOGIES CO.,LTD 1642AG

------End------